

Day of Obs. 1875.	Satellite.	Phenomenon.	Instrument.	Oxford Mean Solar Time of Observation. h m s	Greenwich Mean Solar Time from N.A. h m s	Obser- ver.
June 12	II.	Trs. ingr. first contact	,,	11 25 70	11 26	K
		„ bisection		11 28 6.5		
		„ last contact		11 31 6.0		
23	III.	Ecl. reap. first seen	,,	10 41 40.7	10 48 0.4	,,
		„ full brightness		10 46 20.0		

Notes.

April 5. J. III. Ecl. disapp. The satellite gradually faded to the merest point of light before finally disappearing.

12. Cloudy.

13. The phenomenon at disapp. was given as an eclipse in the *Nautical Almanac*, but it was observed as an occultation.

20. J. II. Trs. egr. The planet unsteady.

27. J. II. Trs. ingr. Cloudy.

28. The planet very tremulous as seen in the Heliometer.

May 5. Cloudy.

11, and 18 Occ. reap. Clouds prevented the previous phases of the phenomenon being observed; the last contact tolerably satisfactory.

J. III. Ecl. disapp. The planet and satellites were seen only by glimpses on account of the sky, and the satellites disappeared between the two times noted.

25. Jupiter "boiling."

27. Cloudy.

June 5. A very bad and very tremulous image of the planet.

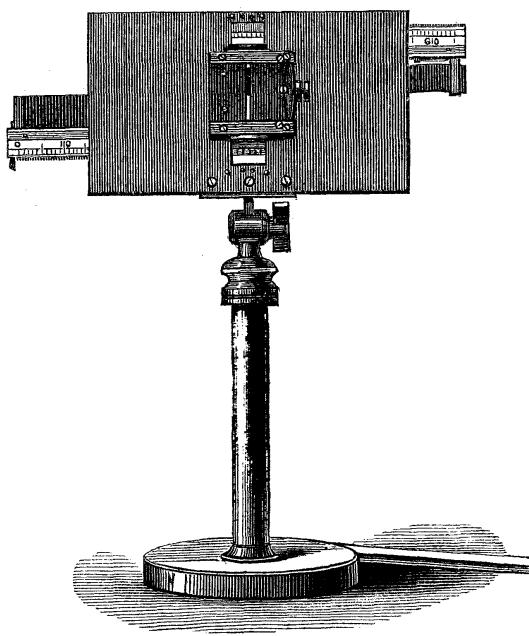
The initials L., K., B., are those of Mr. Lucas, Mr. Keating, and Mr. Bellamy.

The instruments used were the Heliometer with power of 200, and the 10-foot telescope with power of 160.

On a Diaphanometer. By Captain W. de W. Abney, R.E.

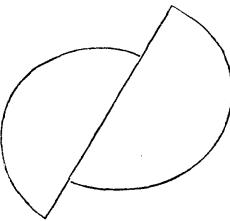
Though perhaps not strictly within the field of Astronomy, I have ventured to bring before the notice of the Society this evening a small instrument which I have called a Diaphanometer, and which can also be used as a photometer. The instrument itself, in its simplest form, consists of a wedge of dark glass corrected for refraction, together with a means of placing any diaphanous or translucent substance in juxtaposition with it. A luminous body in rear enables the experimenter to judge through which part of the wedge the same intensity of light penetrates, as it does through the diaphanous body. The instrument exhibited consists of smoke-coloured wedges, moving with a rack-and-pinion motion, with a scale attached behind a face on which is placed an adjustable slit. Over these wedges can be placed a strip of the substance whose translucency is to

be estimated; which can likewise be moved by a rack-and-pinion, so as to bring any portion of it opposite the slit. I have used the instrument extensively in measuring the opacity of different



films (particularly photographic); and also, by the aid of a prism of total reflection placed immediately in rear of the top part of the slit, and substituting a wedge for the translucent body (thus having wedges at the top and bottom of the slit). By desire of the Royal Engineer Committee a large number of determinations of the illuminating powers of different lights have been made. These determinations have proved to be at least as accurate as when using the ordinary photometers; and the method has, it seems to me, the advantage of compactness. When using the instrument to measure translucency, the slit is generally illuminated by means of a screen of very thin tissue paper, on which is thrown any convenient light; either a portion of the spectrum (if it be required to judge of the translucency for any particular colour) or the sodium light. The wedge is moved by the rack-and-pinion till the lights through the top-half and the bottom-half of the slit appear of equal intensity.

The scale is then read off, and the intensity of transmitted light is at once known. The plan adopted of ascertaining when the two halves of the slit are of the same brightness is as follows:—a split lens is used as the object-glass of a small telescope, the optical centres being separated sufficiently to give two defined images. In that exhibited, made of cardboard, the separation is about $\frac{1}{4}$ -inch. When the line of division of the two halves of the object-glass is inclined at a small angle to the line of the



slit, two distinct images of the slit are obtained, the top portion of one being side by side with the bottom portion of the other. As these appear on a black background, it is very easy to judge when the two portions appear of equal intensity. Of course, if the two portions of the object-glass be not exactly equal, an untrue result would be obtained; but by turning the object-glass through 180° , another reading is obtained, and the mean of the two intensities gives the truth.

Another instrument is here to which I have applied the same method of reading. It is a Spectroscope, with a slit on each side of the axis of the tube, the light being reflected through the collimator and prisms by two small prisms of total reflection. Two spectra are thus placed one over the other, a moveable slit is placed behind the prisms, and a telescope similar to that described is employed for ascertaining when the intensity of any particular part of the two spectra are equal. In this case the intensities are equalised by opening or closing one or other of the two slits; whence, knowing the aperture between the jaws, the intensities are easily calculated. I am in hopes that this, in a modified form, may be useful in stellar spectroscopy.

The Diaphanometer has lately been employed in determining photographic irradiation as applied to solar photography; and I trust that by its use some involved points in that subject may be cleared up definitively. It is on these grounds alone that it has been submitted to the notice of the Society. I should be glad if any Fellow would offer any suggestion as to its improvement. I may mention that, when first the instrument was used the intensities were judged without any telescope; however, greater accuracy is ensured by using it. I have to thank Mr. Browning for the care he has taken in carrying out my designs, both in this and the double spectroscope.

Note on the Suspected Variability of B.A.C. 740, 4,166, and 4,193.

By Colonel Tennant.

B.A.C. 740 was wanted, but could not be found by Capt. Strahan or myself in our Transits (3-in aperture). It was also invisible in the Equatoreal finder, but the B.A.C. stars on the two sides of it in the field were seen well. B.A.C. 4,166 and 4,193 would not bear the slightest illumination in my Transit on April 24. I estimated them at 8 mag. and 8.5 mag. respectively on that day. They were certainly far below 6 mag., which I can easily observe with full illumination.

Possibly all these stars are variable.

1875, May 5.